Distribution Network Planning & Inventory Optimization Supported by Simulation

Amalgama

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Presentation summary

Why this case study?

Project background & modeling task definition

Modeling replenishment in supply chain

(Big) data issue at validation and scenario analysis

Model video

Modeling results / value for the client

Why this case study?

1. Share our experience in real supply chain simulation modeling
2. Combination of AnyLogic model and advanced data analysis technologies
3. Give an example of real value brought to the client by simulation

Project background

Background:

- Diageo Russia – one of Russian top-5 wholesale alcohol beverages distributors
- Low-margin business very sensitive to customer service level and logistic costs

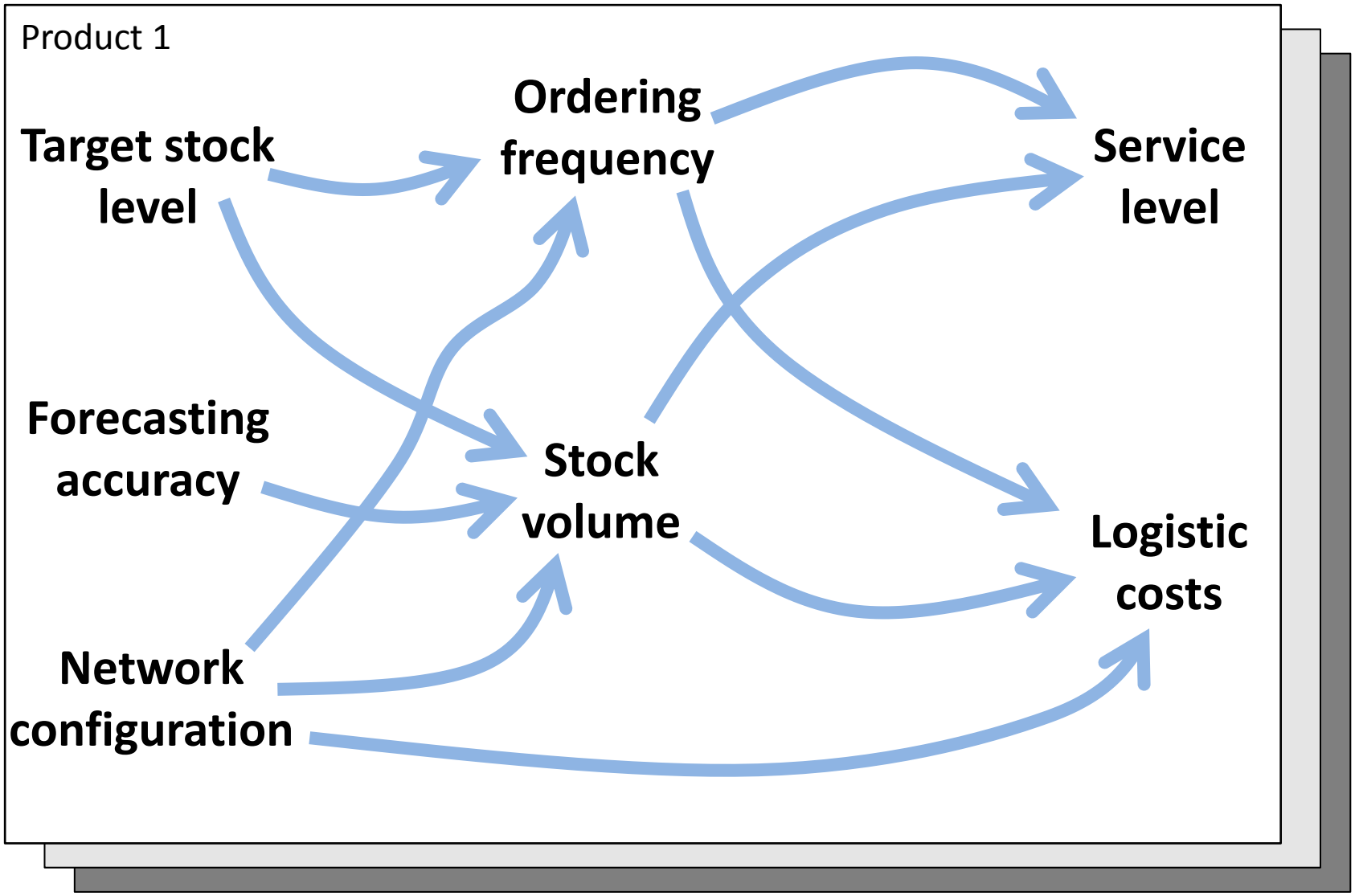
Issues & challenges:

- Increase of logistic costs per unit sold even with growth of sales volume
- Plans of expansion outside European Russia to Urals and Siberia
- Plans of opening a new factory in Russia

Consulting project tasks:

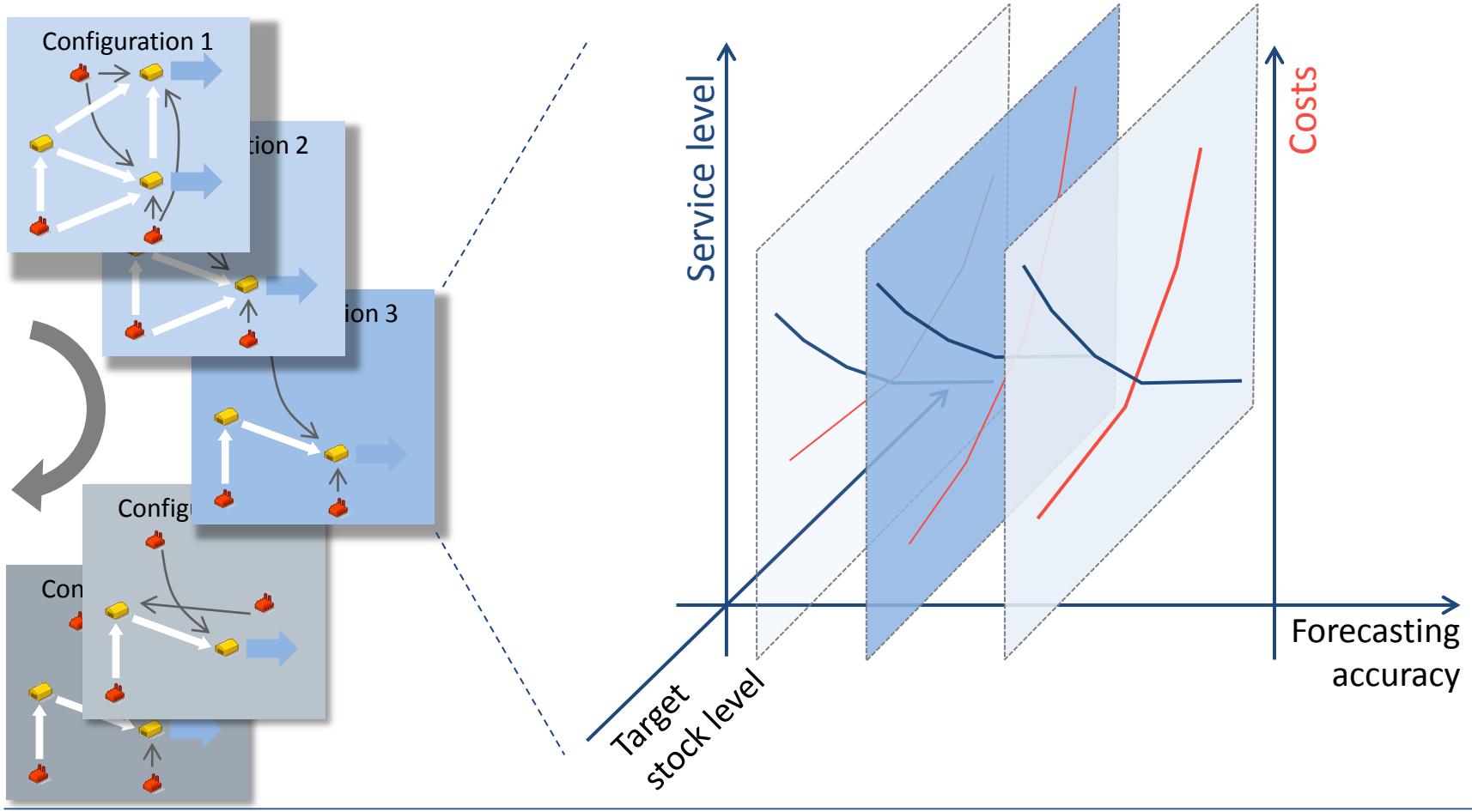
- Show and prove the ways to decrease logistic costs
- Choose logistic network configuration for the expanded client network

Why simulation

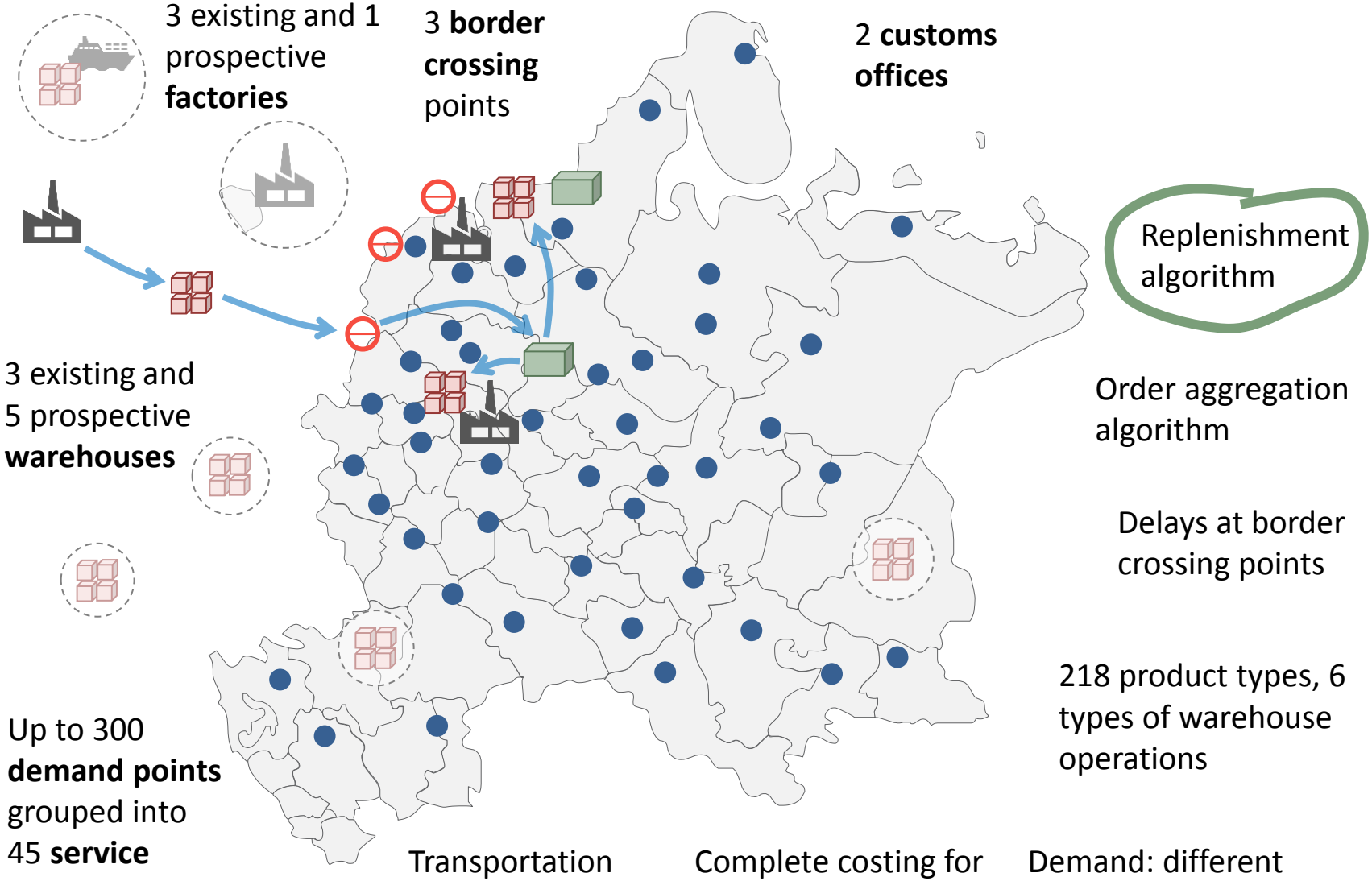


Simulation task definition

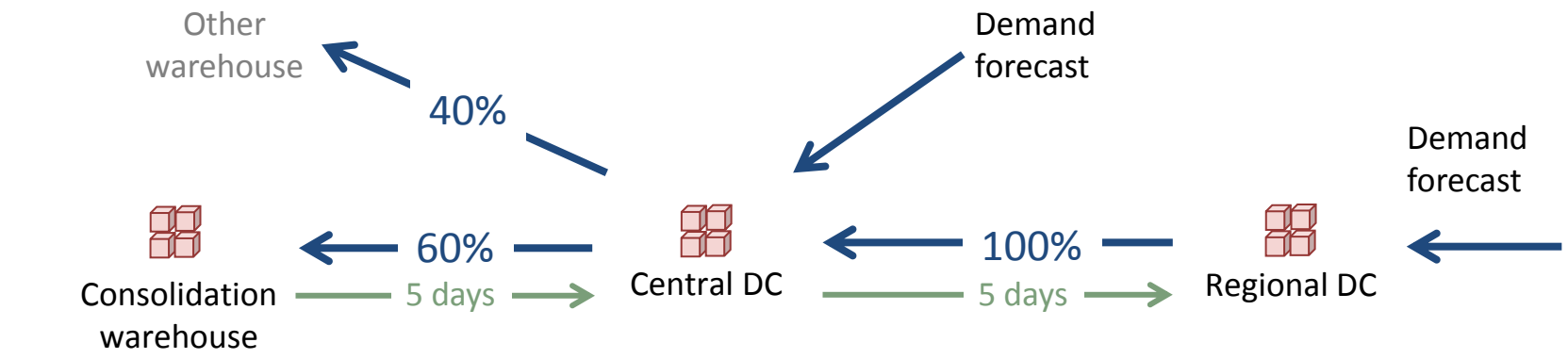
- For every logistic network configuration determine how forecasting accuracy and target stock level influence logistic costs and service level



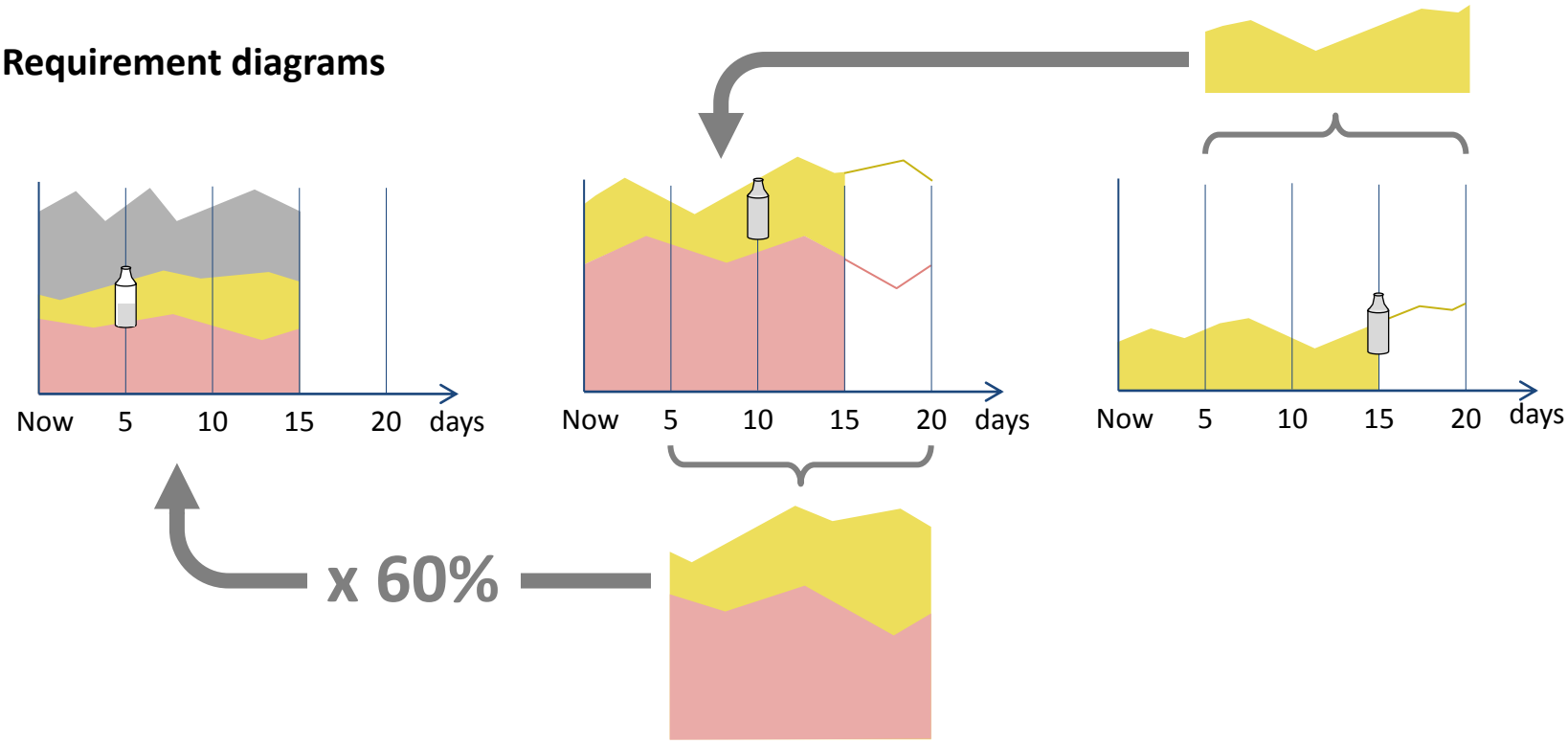
Supply chain at a glance



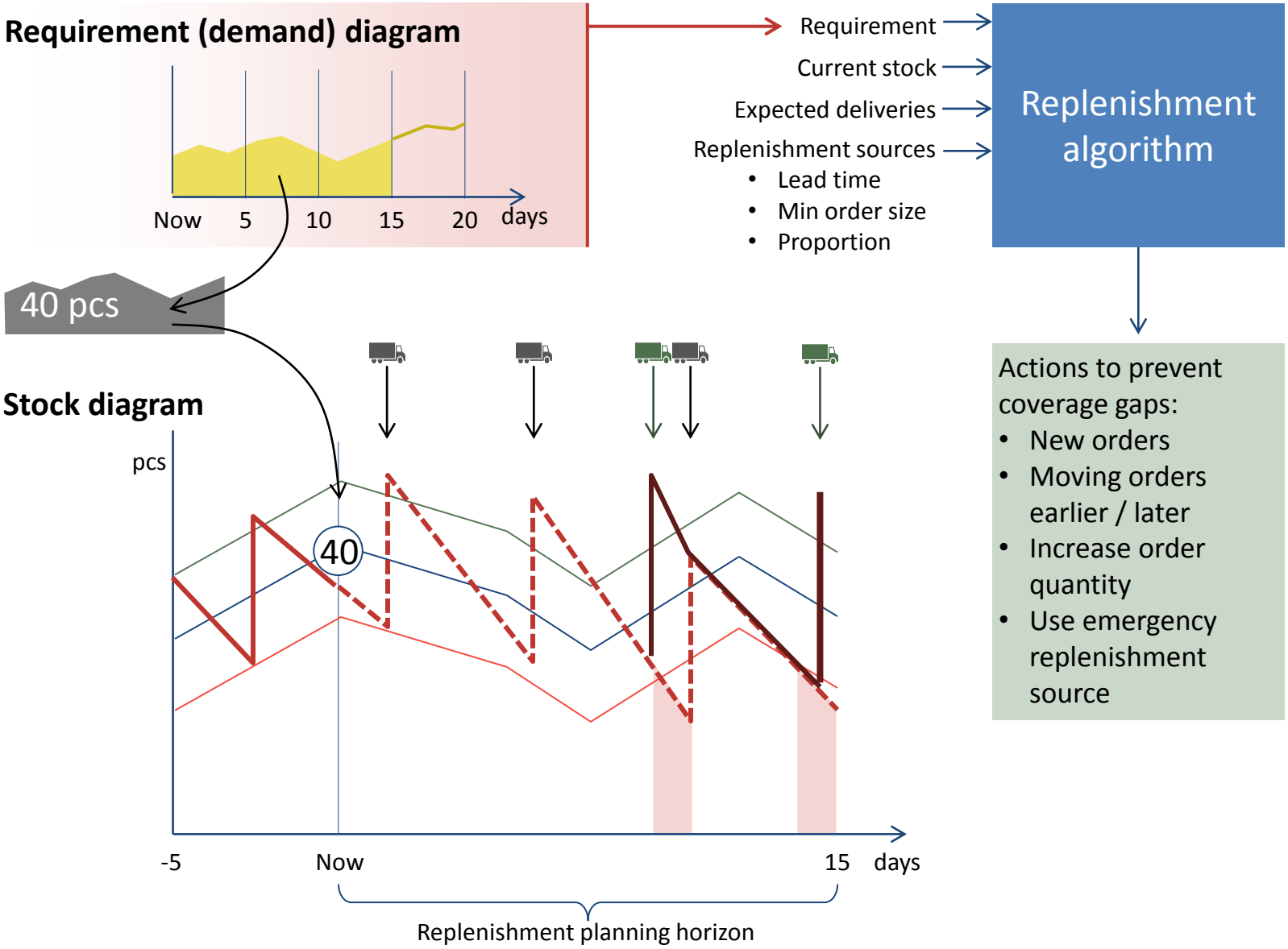
Requirement distribution



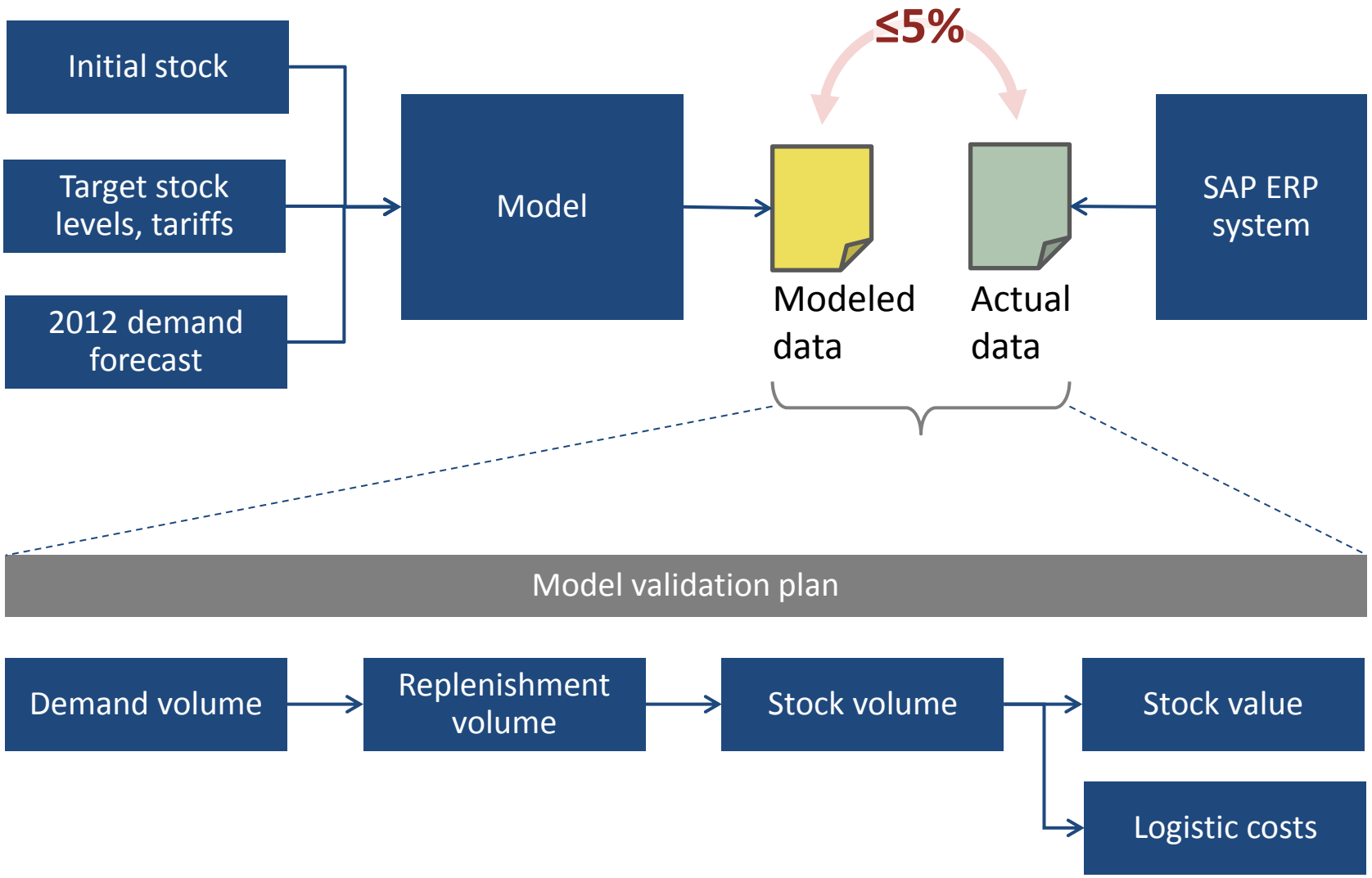
Requirement diagrams



Replenishment algorithm

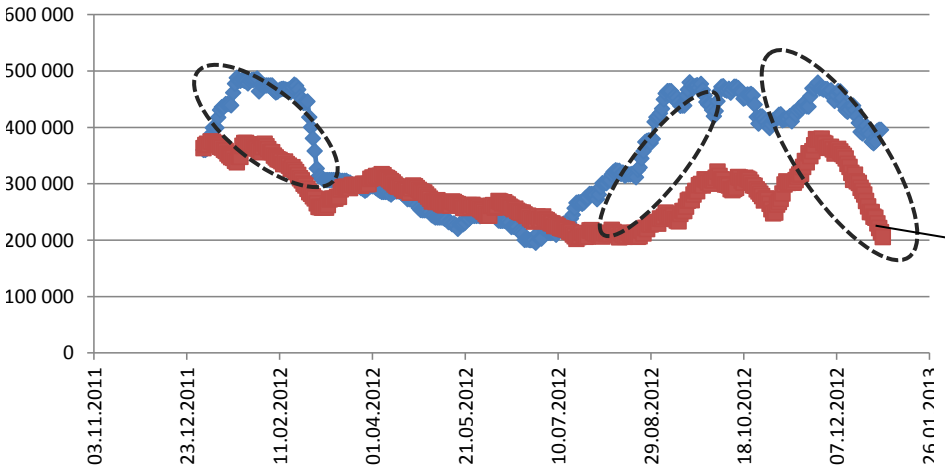


Model validation



Obstacle with too much data

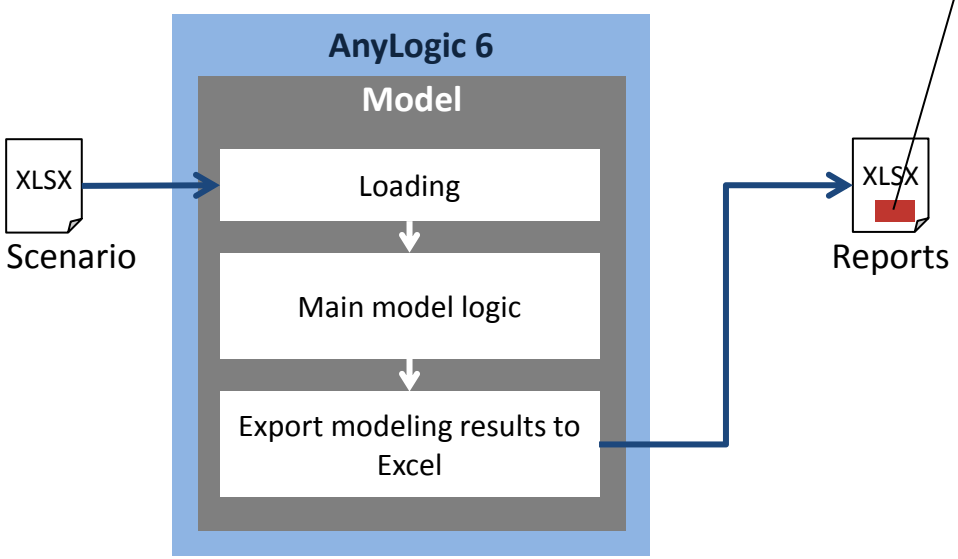
Stock level at Moscow Warehouse



Actual data

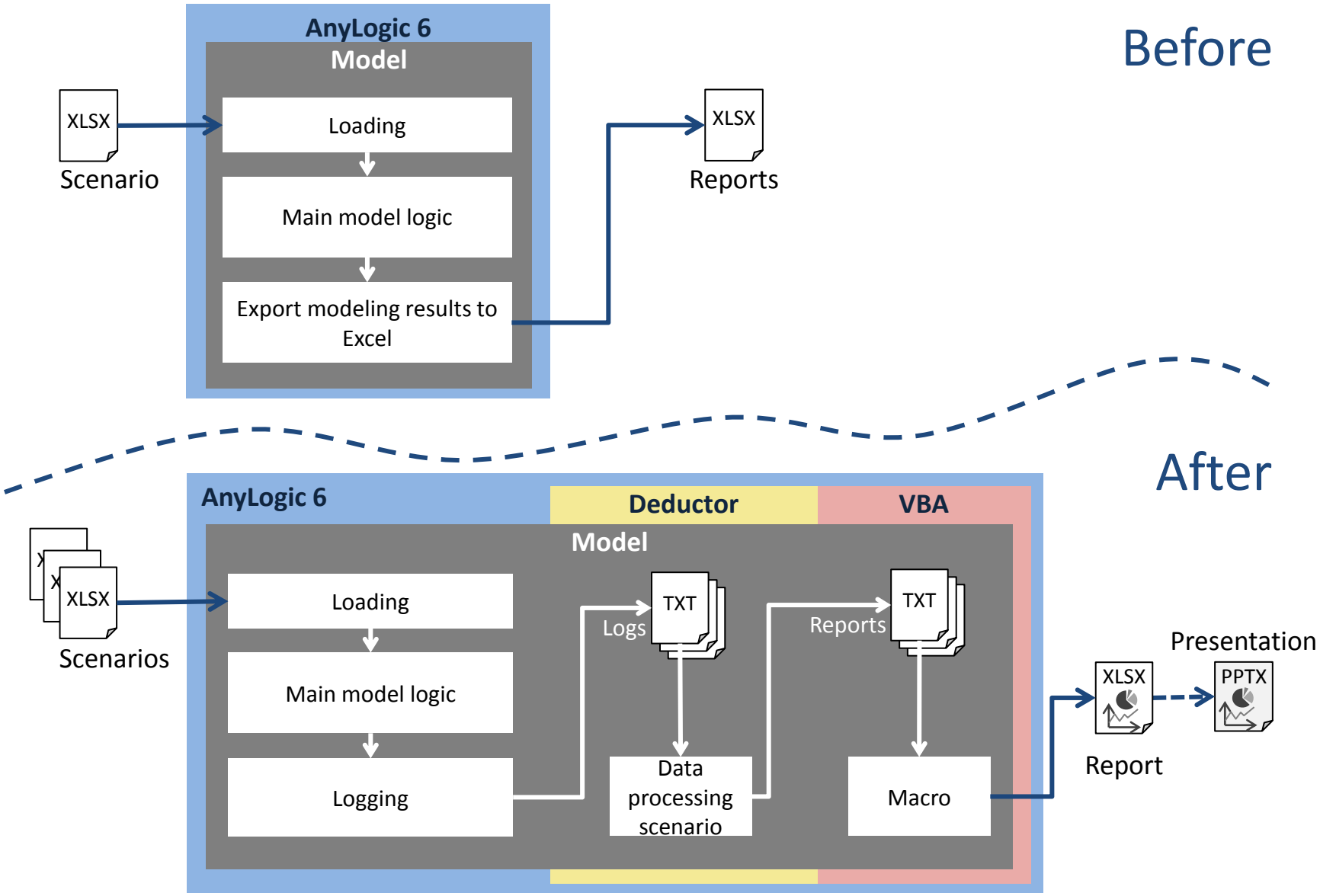
Modeled data

- What is the structure of the number?
- What products have stock lower than actual?
- Did we order less than it was required? Why?

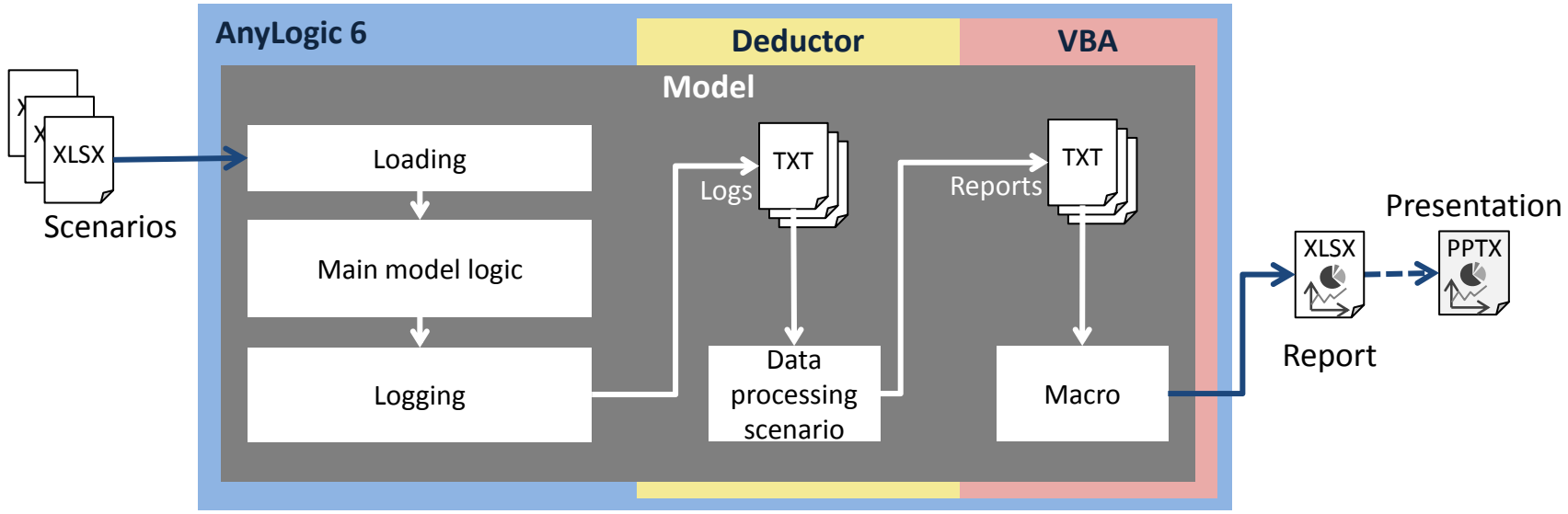


- Re-launch model
- Stop experiment at certain moment
- Look at model state in AnyLogic
- Implement a new report in AnyLogic

New model structure



Advantages of the new model structure



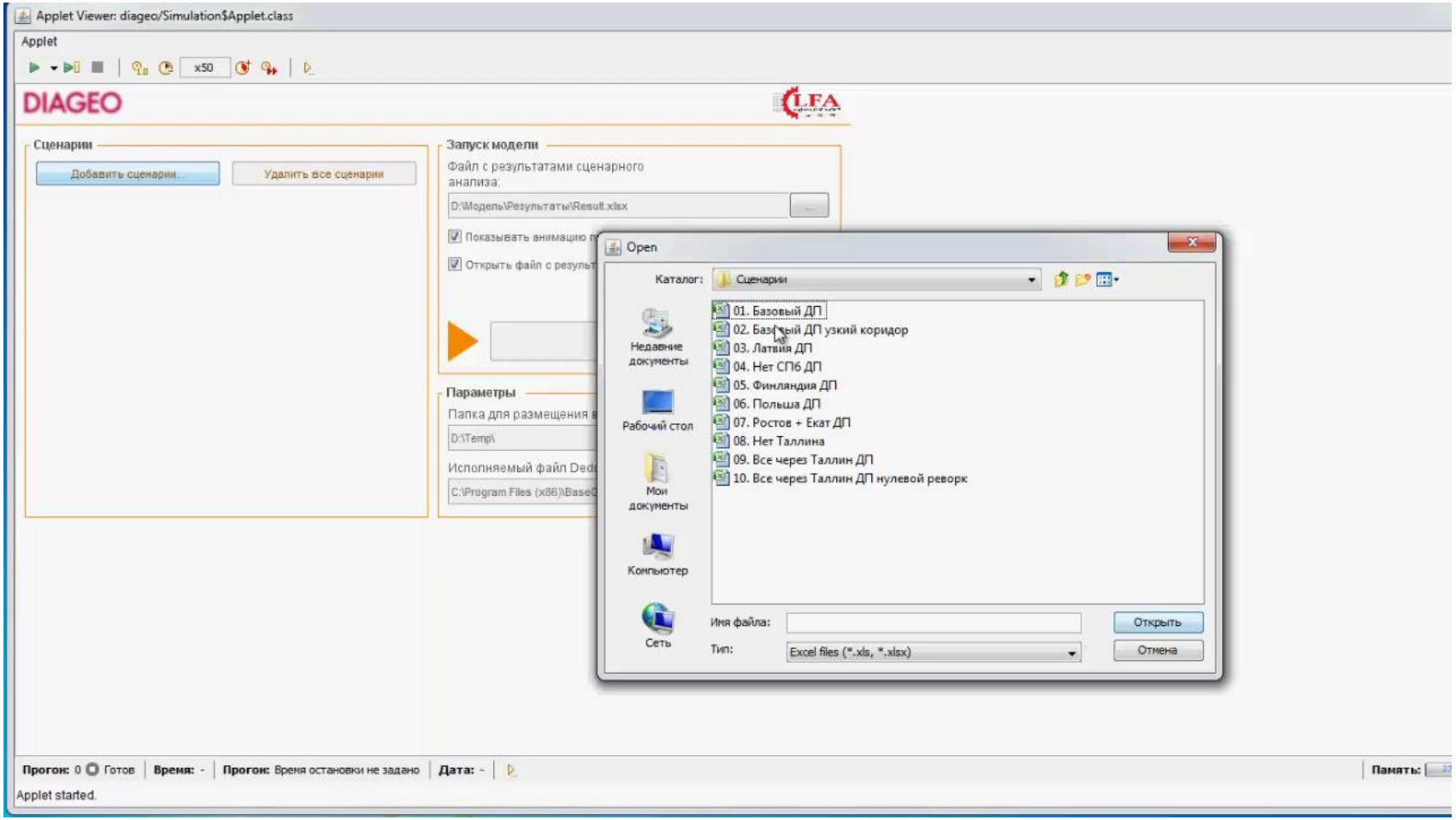
Experiment run time decreased 5 times

Up to 3 times less effort to prepare presentation for project team meetings

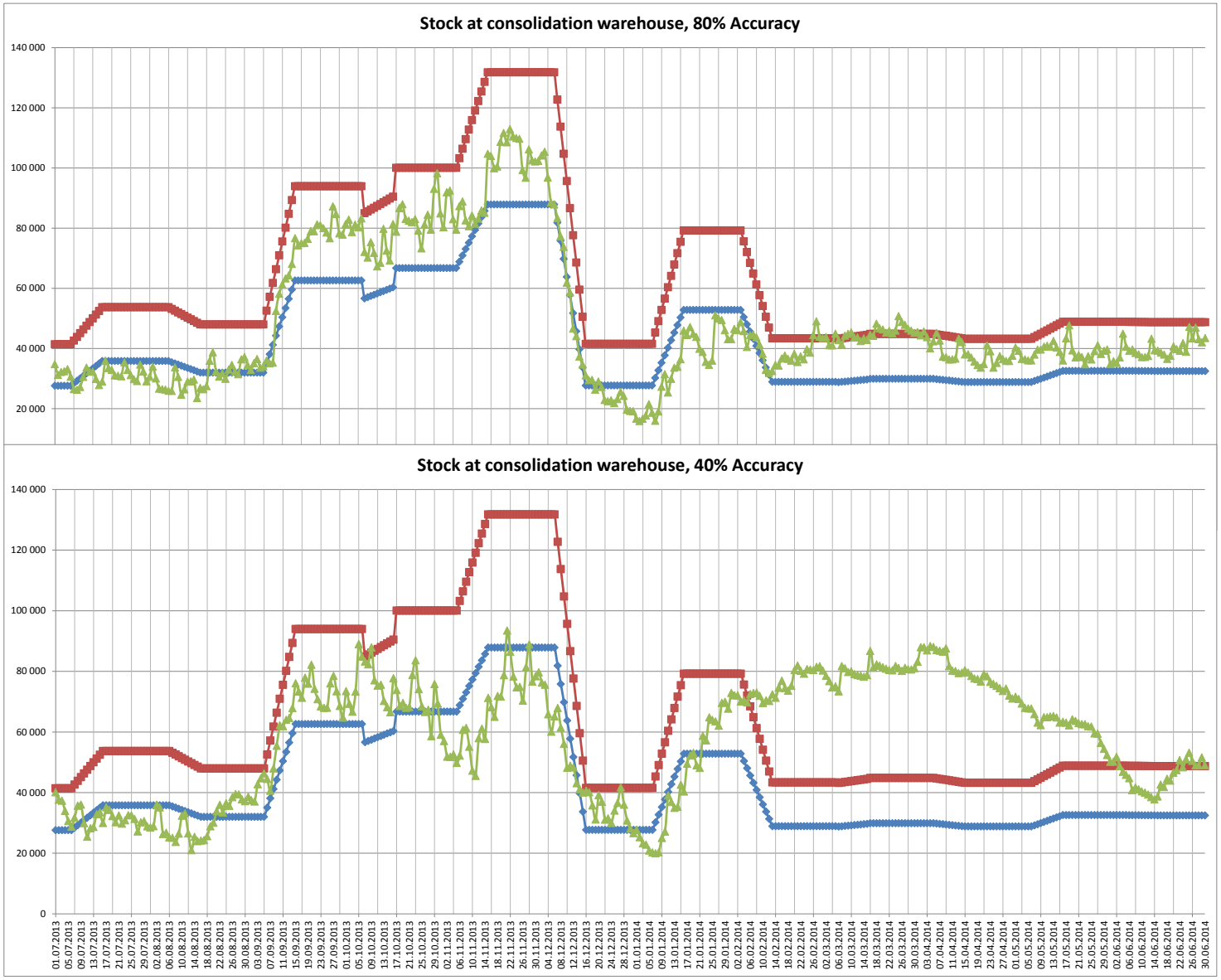
Modification of reports without editing the model in AnyLogic. Simulation modelers and business consultants can work separately!

- Less time for model validation
- More attention to business consulting
- More supply chain options considered

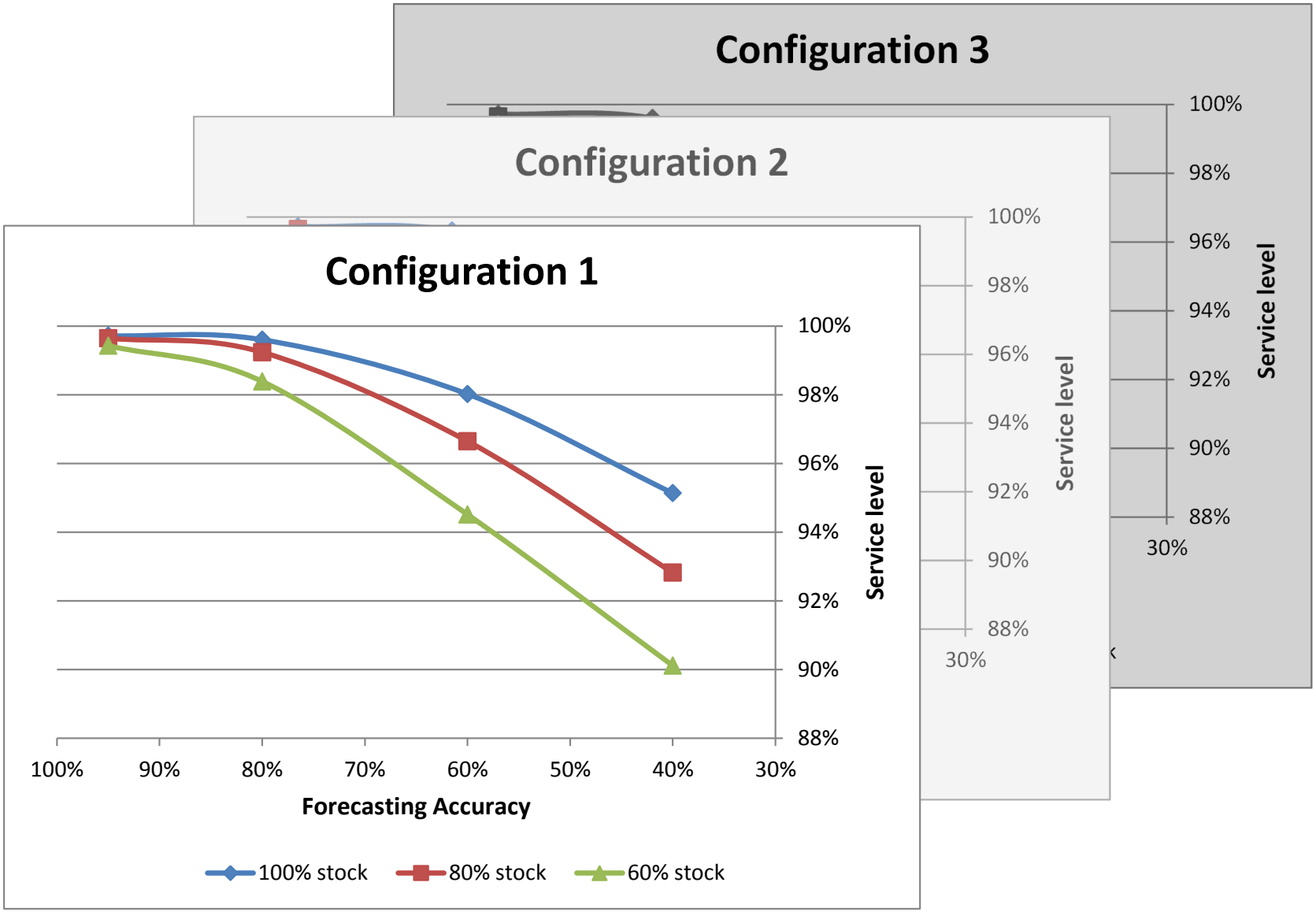
Model video


Applet Viewer: diageo/Simulation$Applet.class
Applet
x50
DIAGEO
LFA
Сценарии
Добавить сценарии...
Удалить все сценарии
Запуск модели
Файл с результатами сценарного анализа:
D:\Модель\Результаты\Result.xlsx
Показывать анимацию
Открыть файл с результ
Параметры
Папка для размещения
D:\Temp\
Исполняемый файл
Open
Каталог:
Сценарии
Недавние документы
Рабочий стол
Мои документы
Компьютер
Сеть
01. Базовый ДП
02. Базовый ДП узкий коридор
03. Латвия ДП
04. Нет СПб ДП
05. Финляндия ДП
06. Польша ДП
07. Ростов + Екат ДП
08. Нет Таллина
09. Все через Таллин ДП
10. Все через Таллин ДП нулевой реворк
Имя файла:
Тип:
Excel files (*.xls, *.xlsx)
Открыть
Отмена
Прогон: 0 Готов
Время: -
Прогон: Время остановки не задано
Дата: -
Память:
Applet started.

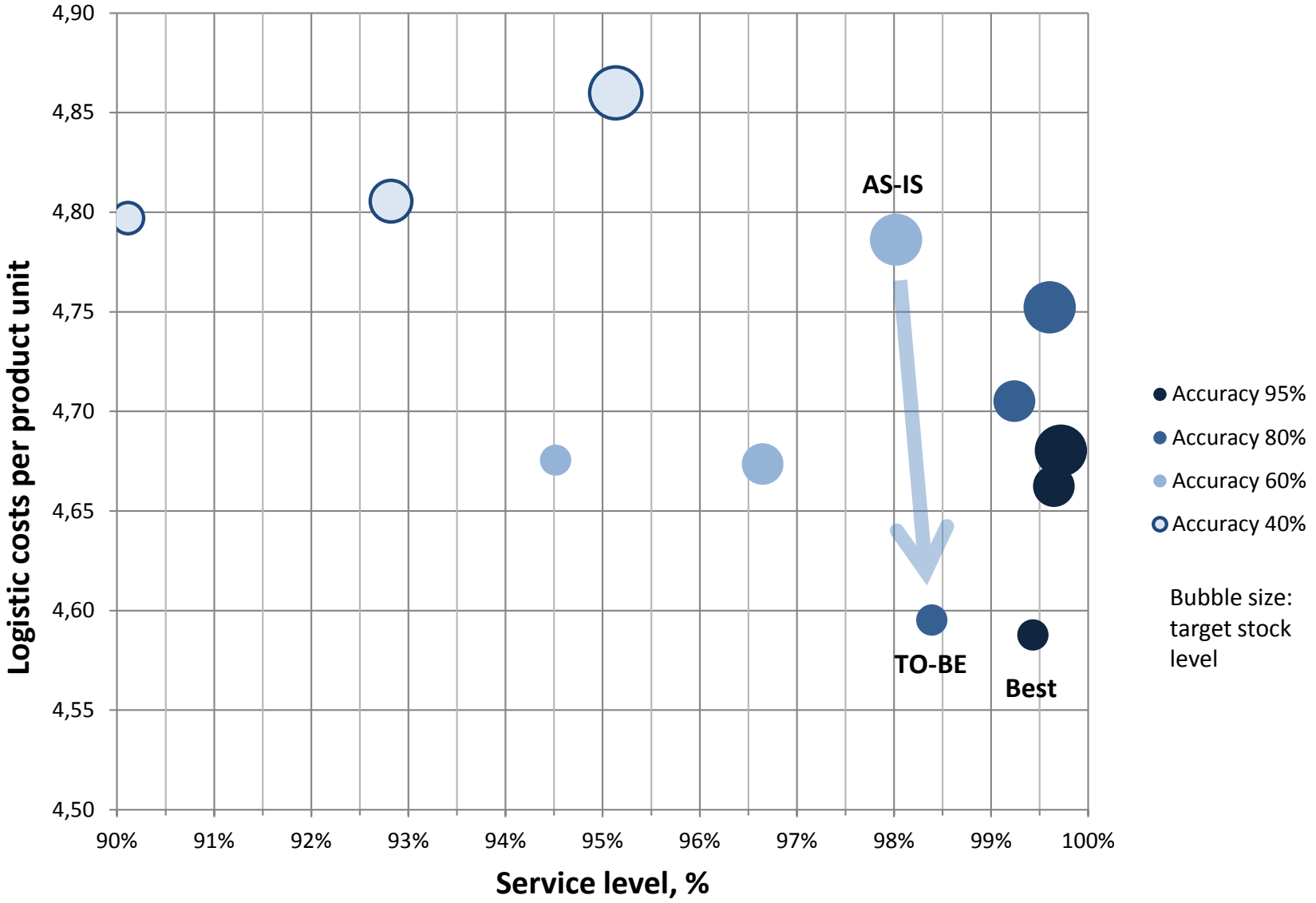
Stock at different forecasting accuracy



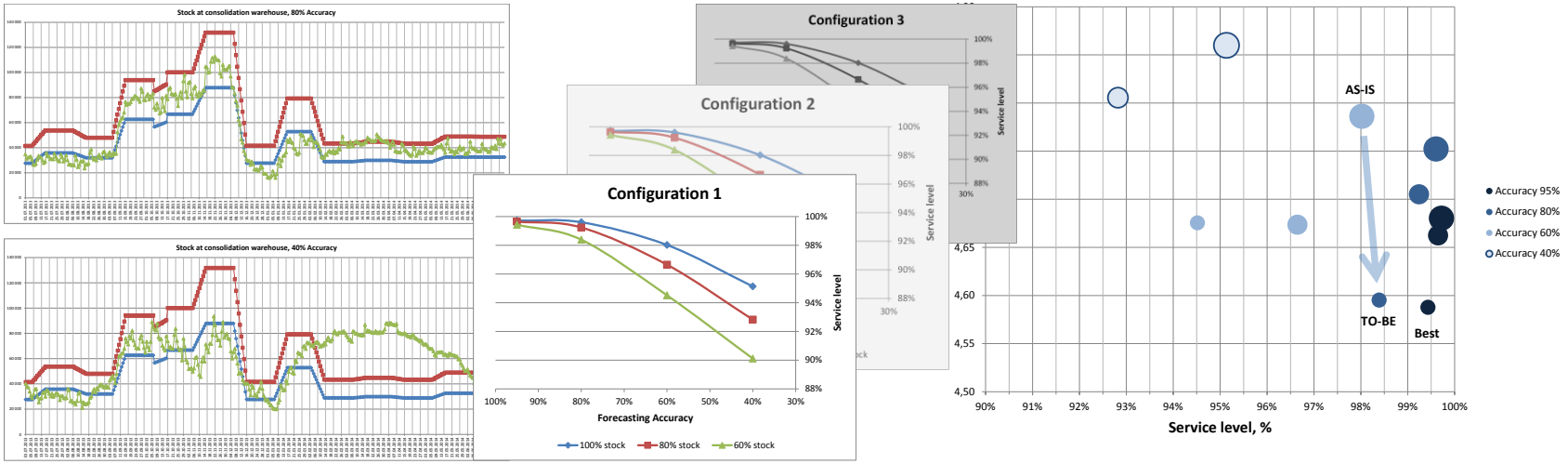
Service level vs. target stock & accuracy



Consolidation of simulation results



Business recommendations



- Pay-off period of initiative for increase sales forecasting accuracy from 60% to 80% is less than 2 years
- 20% increase of forecasting accuracy will allow to reduce target stock level by 40% which will reduce logistic costs per unit by 7%
- Opening regional warehouses will require unreasonably big stock to maintain target service level

Conclusion

- Experience shows that development of flexible and re-usable models needs coding. Support of using programming is an advantage of AnyLogic

- Model validation and scenario analysis require a lot of effort for data transformation and representation. Adding wider support of data-related operations into simulation tools would increase the efficiency of simulation projects